This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

LANE MEDICAL LIBRARY STANFORD
B271 .J66 1916 STOR
Abolish the Fahrenheit thermometer / Spe
24503283597

Johnson, A.
Abolish the Fahrenheit thermometer.

ABOLISH THE FAHRENHEIT THERMOMETER

SPEECH

OF

HON. ALBERT JOHNSON

OF WASHINGTON

IN THE

HOUSE OF REPRESENTATIVES

DECEMBER 14, 1915

> "Let us not shift our burden needlessly, sluggishly, cravenly, onto the shoulders of our successors; they will have plenty of burdens of their own. Let us profit by the opportunity to earn high credit for energy and progressive spirit ourselves and to stimulate our successors by our example to earn similar credit in the many lines that will still be open to them."

WASHINGTON
1916

20806—14863

LANE LIBRARY

B271
J66
1916

SPEECH

OF

HON. ALBERT JOHNSON,

OF WASHINGTON.

The House had under consideration the bill (H. R. 528) to discontinue the use of the Fahrenheit thermometer scale in Government publications, as follows:

"*Be it enacted, etc.,* That the centigrade scale of temperature measurement shall be the standard in United States Government publications, the use of the Fahrenheit scale being discontinued, at the option of heads of departments or other independent branches of the Government, either immediately upon the signing of this bill or at any time before January 1, 1920, except as provided in section 3.

"SEC. 2. During the period of transition the Fahrenheit equivalent of centigrade degrees may be added in parentheses or as a footnote or in any other way, if in the opinion of heads of departments or independent officers it seems necessary.

"SEC. 3. The use of the Fahrenheit scale shall be permitted after January 1, 1920, in cases where it is required by State or municipal law, or in certificates of tests of instruments graduated in the Fahrenheit scale."

Mr. JOHNSON of Washington. Mr. Speaker, on December 6 I introduced House bill 528, providing for the discontinuance of the Fahrenheit thermometer scale in Government publications. My sympathy with this movement is hereditary, and in introducing the bill I felt that I was performing an act of piety to the memory of my father. He was by compulsion of circumstances a lawyer, by natural gifts and tastes a chemist, physicist, and inventor. One of the things I remember most vividly is the impatience with which he often complained of the nuisance of having to handle two thermometric scales, one used by nearly all scientists throughout the world, the other in popular use in English-speaking countries, whereby he was perpetually compelled to convert one into the other, with perpetual nerve irritation and loss of precious time. President Van Hise, of the University of Wisconsin, writes me that, as a result of the adoption of the centigrade scale by the American Institute of

9289

Electrical Engineers "an untold amount of time and labor has been saved." In reading that phrase I thought I could almost hear my father's voice. It is a profound satisfaction to me to know that if he were living now he would thank me for this bill.

The movement was started by an article by Dr. Robert Stein in the Washington Post. I may add that much of the work in connection with the bill has been done by Dr. Stein.

ABOLISH THE FAHRENHEIT THERMOMETER.

By Robert Stein.

[From the Washington Post, Oct. 17, 1915.].

One glance suffices to show the simplicity of the centigrade, the complexity and clumsiness of the Fahrenheit thermometric scale.

Centigrade: Freezing point, 0°; boiling point, 100°.

Fahrenheit: Freezing point, 32°; boiling point, 212°.

The abolition of the Fahrenheit scale would be welcomed by scientists the world over. The centigrade scale is used in all countries except the United States and the British Empire. Even in these it is largely used by scientists, who are thus compelled to think in two scales, and to specify the scale by the letter C. or F. If you are told that the thermometer at some foreign locality registered 40°, without C. or F., you do not know whether the people wore Palm Beach suits or overcoats. Many a scientist ruefully remembers precious hours which he had to waste in trying to find out whether a given temperature was C. or F. If all temperatures were recorded in degrees C., the discomfort of doubt would not exist.

Freezing point, the zero of the centigrade scale, is the natural zero from which everybody consciously or unconsciously reckons. What is meant by 40° F. or 22° F. or —4° F.? You do not know until you find out how many degrees it is above or below freezing point. Thus—

40° F. means 8 degrees above freezing point (40—32).
22° F. means 10 degrees below freezing point (32—22).
—4° F. means 36 degrees below freezing point (32 + 4).

Centigrade degrees require no calculation, because the figures themselves tell how many degrees they are above or below freezing point. Thus—

22° C. means 22 degrees above freezing point.
—4° C. means 4 degrees below freezing point.

The Fahrenheit thermometer has remained in use simply because it is the oldest. It has a mere squatter's right. Constructed in 1720, and being the only accurate thermometer then in existence, it was adopted in England all the more readily because Gabriel Daniel Fahrenheit, a native of Danzig, in Germany, long resident in Holland and England, was a member of the Royal Society of London, in whose transactions some of his papers were published. He placed his zero at the lowest temperature known to him, to wit, 32° below freezing point.

The first thermometer with zero at freezing point was constructed in 1731 by René Antoine Ferchault de Réaumur, a native of La Rochelle, in France, long resident in Paris. He called boiling point 80.

In 1742 the first centigrade thermometer was constructed by Anders Celsius, professor of astronomy at Upsala University, Sweden. In most countries the centigrade scale goes by the name of Celsius.

The Réaumur was widely used till the French revolution, when, in the beneficent movement to decimalize all standards, the Celsius was adopted and officially called centigrade. The dominant influence of France at the beginning of the nineteenth century rendered to the world the great service of making the centigrade fashionable, with the result that the Réaumur has gradually gone out of use, to the great relief of all workers who have to compare the temperature records of different countries. The disappearance of the Fahrenheit would be a still greater relief.

Fahrenheit's mistake in placing the zero not at freezing point, but 32° below it, has been perpetuated for 195 years simply because nobody has taken the trouble to propose its discontinuance. It is a classic example of the incredible inertia of accomplished facts. Because a German instrument maker in his shop at Amsterdam, on an ill-starred day in 1720, wrote 32 opposite a certain mark when he should have written 0, therefore 160,000,000 English-speaking people year after year continue helplessly to call that mark 32 instead of 0, although the right method has been used simultaneously since 1742, having become international through the sheer force of its simplicity. Year after year thousands of learned men, fuming with impatience, spend valuable time in converting Fahrenheit into centigrade degrees and vice versa, when there ought to be no need of conversion at all. Year after year we have grumbled and growled and groaned at the lethargy which allowed the wrong system and the right system to continue side by side, and thus to create so much unnecessary labor, doubt, confusion, and vexation; year after year we have wondered why somebody did not move that the wrong system be dropped; year after year every one of us has waited for somebody else to make the move. "Habit is an iron shirt" says the German proverb.

This long-delayed reform presents less difficulty than most reforms, because most of the people who deal in temperatures are already familiar with the centigrade and prefer it. "If Newton's law of gravitation conflicted with vested interests," says Macaulay, "it would not be accepted yet." Happily in the present case no important vested interests are involved. At very little expense the Fahrenheit scale on each thermometer could be replaced by the centigrade scale.

The Weather Bureau, the great source of temperature data, can not make the change without congressional sanction. If that bureau were authorized to use the centigrade, the public would acquire the new habit almost instantly and without effort, and would welcome the relief afforded by its simplicity just as they welcomed the simplicity of standard time. The only landmark they would have to fix in their minds would be normal blood heat, about 98.6° F., which would thereafter be called 37° C. As an air temperature this represents the summer maximum, which, fortunately, is not often exceeded in the United States.

Before introducing the bill I thought it best to submit it for criticism to some 200 scientists. Of the replies received to date 131 were favorable, 7 unfavorable. Extracts from the letters are appended. The necessity of concentration compels me, to my keen regret, to forego the pleasure of publishing these interesting letters in full, but I hope that an opportunity for so doing may present itself later on. The extracts contain the answers to the objections that have been raised.

Many correspondents, as might be expected, take occasion to advocate the substitution of the metric system for our traditional weights and measures, while others deprecate any attempt to make the centigrade scale a yokefellow to the metric system. With the latter view I thoroughly agree. The metric system and the centigrade scale are two totally different subjects, and the attempt to yoke them together would merely create confusion. The essential advantage of the metric system lies in this, that it enables multiplication and division to be performed by the mere moving of the decimal point. This has nothing to do with the centigrade scale, because there is no occasion to multiply and very little occasion to divide degrees of temperature. Conversely, the essential advantage of the centigrade scale lies not in the division of the thermometric base into 100 degrees but in placing the zero at freezing point. This evidently has nothing to do with the metric system. Everybody will admit that the inconvenience attending the general introduction of the centigrade scale would be trifling compared with the inconvenience involved in the general introduction of the metric system. A mouse can enter where an elephant can not; but if the mouse is tied to the elephant, you can easily see what will happen.

It has been suggested that four years is too short a time in which to make the change. If scientific men share this view, I shall, of course, be glad to accept an amendment lengthening the period to 8 or even 10 years.

RESOLUTIONS.

BOTANICAL SOCIETY OF WASHINGTON, D. C., NOVEMBER 2, 1915.

Whereas the Botanical Society of Washington recognizes the confusion, inconvenience, and loss of time and efficiency occasioned by the lack of uniformity in recording temperatures in this country; and

Whereas the centigrade scale is much simpler and more convenient than the Fahrenheit scale and is the present standard in all other countries except Great Britain, and is also in general use among scientific men throughout the world: Therefore be it

Resolved, That this society expresses its hearty approval of the efforts being made to obtain legislation requiring the use of the centigrade scale in all future Government publications.

RESEARCH CLUB OF THE UNIVERSITY OF MICHIGAN, NOVEMBER 17, 1915.

I secured the adoption of a resolution favoring the bill by the Research Club of the University. (*W. B. Pillsbury.*)

BOARD OF DIRECTORS AMERICAN CHEMICAL SOCIETY, DECEMBER 11, 1915.

Resolved, That the directors of the American Chemical Society are unanimously in favor of the bill presented by Hon. ALBERT JOHNSON for the adoption of the centigrade scale of temperature measurement in United States Government publications, with the understanding that for such time as may be deemed necessary the Fahrenheit scale may follow in parentheses where the various bureaus deem such inclusion wise.

AMERICAN ENTOMOLOGICAL SOCIETY, DECEMBER 13, 1915.

At a meeting of the American Entomological Society, held December 13, 1915, H. R. 528, a bill to discontinue the use of the Fahrenheit thermometer scale in Government publications, was fully indorsed. (*Henry Skinner*, recording secretary.)

ROCHESTER ACADEMY OF SCIENCE, DECEMBER 13, 1915.

In the opinion of the Rochester Academy of Science, your bill permitting the use of the centigrade thermometer in the various departments of the United States Government is a desirable measure, and deserves our indorsement. The academy does not favor forcing it upon any department or bureau. (*George H. Chadwick*, secretary.)

EXTRACTS.

I wish to express my most hearty approval and to say that if this bill passes the result will be a decided increase in the efficiency of everyone who has to do with temperature measurements. It is hard to estimate the time which would be saved in the long run by all users of the present double system, but it would certainly be very great. I wish to assure you of the most vigorous support of myself and of all my colleagues, as well as of the American Institute of Electrical Engineers, which body has done its best to support the gospel of the decimal system. (*Comfort A. Adams*, professor of electrical engineering, Harvard University, Cambridge, Mass.)

I believe the change would be a good one. (*Chester Allen*, assistant and field organizer, extension division, University of Wisconsin, Madison, Wis.)

I heartily favor the change from the Fahrenheit to the centigrade scale and am glad to indorse any measure to that end. I believe, however, that the change will naturally be a somewhat gradual one, and that for the present it would be unwise to rely solely on the centigrade scale in certain classes of Government publications. Many of these publications are intended for popular consumption—for farmers and persons who are accustomed to thinking in terms of the Fahrenheit scale. Some of our practical directions to farmers include the item of temperature. In that class of publications I think it would be preferable to state the temperature according to both scales. This would perhaps be allowable under the proposed legislation, the Fahrenheit denomination being given in parentheses after the centigrade. (*E. W. Allen*, Chief Office of Experiment Stations, Department of Agriculture, Washington, D. C.)

The proposed change commends itself on the ground of economy and efficiency in all aspects of Government work that touch upon scientific or permanently valuable contributions. The change has to come, and the sooner the better for the credit of all concerned. (*E. A. Andrews*, professor of zoology, Johns Hopkins University, Baltimore.)

Any well-educated person having at heart the progress of this country must join you in the desire of having the Fahrenheit scale of temperature abolished. (*Henryk Arctowski*, chief of science division, New York Public Library; physicist to Belgian antarctic expedition.)

I am heartily in favor of this law. (*Bion J. Arnold*, electrical engineer, chief subway engineer, city of Chicago, 105 South La Salle Street, Chicago.)

I approve the proposed law, in case the change is desired at this time by the officers of the Weather Bureau. (*S. I. Bailey*, Phillips professor of astronomy, Harvard University, Cambridge, Mass.

I think most emphatically that it is time the Government in its publications should rise to international scientific standards, and you will have the cordial support of the great body of scientific men. If our forefathers had not had some initiative we would still be using the clumsy English monetary system in place of our decimal system. It is a pity that they did not go farther while they were about it and change the system of weights and measures. Doubtless the only reason they did not do so was because, at that time, such problems were not regarded as within the jurisdiction of the Federal Government. (*Joseph Barrell*, professor of structural geology, Yale University, New Haven, Conn.)

It does seem to me that it would be a step in advance in our scientific and commercial relations with Latin America if the United States could generally adopt the centigrade system. The only suggestion I can make is that of the parallel use of the Fahrenheit with the centigrade scale until the latter could be generally understood and approved. (*John Barrett*, director general, Pan-American Union, Washington, D. C.)

It would seem desirable to make this change. (*Albert L. Barrows*, professor of zoology, University of California, Berkeley, Cal.)

This is a step in the right direction, and we are strongly in favor of it. In the steel business it is especially desirable to have but one scale, as in recent years a large proportion of the steel plants have had to go quite thoroughly into the question of heat treatment, and a great deal of research work has been done in different countries, employing both the centigrade and Fahrenheit scales. This has not only introduced confusion, but makes it often necessary to translate one into the other. (*G. Bartol*, president, The Otis Steel Co., Cleveland, Ohio.)

The centigrade scale is now used in all specifications for electrical apparatus and in most scientific publications. Its use in Government publications will go far toward securing its general adoption, which is so highly desirable. (*Philip P. Barton*, vice president and general manager, Niagara Falls Power Co., Niagara Falls, N. Y.)

The project should not need much urging since it involves relatively little inconvenience and expense. That it would be of great advantage to bring the temperature scale of the people into conformity with that used by practical scientists, without exception, throughout the world, seems to me obvious. (*Carl Barus*, professor of physics, Brown University, Providence, R. I.)

I should heartily favor the abolition of the Fahrenheit thermometer. Of course it is already abolished in all chemical and physical laboratories. (*George F. Becker*, Chief, Division of Physical and Chemical Research, United States Geological Survey, Washington, D. C. First approval received Oct. 20, 1915.)

I am heartily in sympathy with the bill. It may be of interest to you to know that the following committees, of which I am a member, have adopted the centigrade scale:

First. Special committee on "materials for road construction and standards for their test and use," American Society of Civil Engineers.

Second. Subcommittee on "standard tests for nonbituminous road materials," American Society for Testing Materials.

Third. Committee on 'standard specifications for gravel and broken-stone roads," American Society of Municipal Improvements. (*Arthur H. Blanchard*, C. E., professor of highway engineering, Columbia University; secretary of committee 1, chairman of committees 2 and 3.)

It would be a very great convenience, because it would establish uniformity with the best usage regarding measurements of temperature. It is only due to lack of initiative and to the weight of habit that the Fahrenheit scale still continues in use. The objection that is made to the general introduction of the metric system, namely, that it would require a complete readjustment of machinery, does not hold in the present case. In fact, if the Weather Bureau would introduce the centigrade scale, it would at once be adopted without any difficulty. (*Franz Boas*, professor of anthropology, Columbia University; curator, department of anthropology, American Museum of Natural History, New York.)

I am heartily in favor of the general use of the centigrade. Scientists the world over use the centigrade scale only, as it is much simpler and more rational than the Fahrenheit. (*Marston T. Bogert*, professor of organic chemistry, Columbia University, New York.)

The bill meets our approval. The Fahrenheit scale is an illogical one; there is no reason for using 32° as freezing point and 212° as boiling point. The centigrade is used exclusively by scientists, and is the one in commercial use in practically all civilized countries except the English-speaking ones. It might be necessary to make an exception of the publications of the Weather Bureau until people at large have been educated in the use of the centigrade scale along with the Fahrenheit. (*James E. Boyd*, professor of mechanics; *W. H. Minor*, assistant professor of mine engineering; *D. J. Demonet*, professor of metallurgy; *E. E. Semermeier*, professor of metallurgy; Ohio State University, Columbus, Ohio.)

Like 99 out of 100 scientific men, I am heartily in favor of a change from the Fahrenheit to the centigrade scale of temperature measurement. Such a change means not only a step toward uniformity in scientific measurements, but an actual saving of labor and confusion. Scientific measurements and physical values and constants are more than ever of world-wide interest and should be expressed in terms which are intelligible anywhere in the world. (*A. C. Boylston*, chemist, Mallinckrodt Chemical Works, St. Louis, Mo.)

I have long been in accord with the tendency to standardize not only thermometers but other instruments, indeed, everything that could be standardized, so as to eliminate the trouble in these modern times of having to translate one weight, measure, or coin into the various types that we have in this good country of ours.

Let me illustrate. When we receive an order from the splendid Bureau of Standards—to the director of which, and his assistants, all honor—it comes to us in the metric system; it is the same from the Coast and Geodetic Survey; the same from the Smithsonian Institution; and, if I remember rightly, the same from the Weather Bureau. When, however, these orders come to us from the various arsenals of the Army, West Point Military Academy, United States Navy or War Department, they come to us in English measures.

The writer appeared before the Committee on Coinage, Weights, and Measures on February 6, 1902. The report of my examination, on page

84 of the records of that date, will give you my opinion of the centigrade system, for it is based on the proper kind of standard, viz, the freezing and boiling points of water. Some systems, particularly the Fahrenheit, are about as sensible as the old colored man who said he had no business to buy a barometer, for did not the Lord give him the rheumatism to tell what kind of weather to predict? (*John A. Brashear,* chairman John A. Brashear Co. (Ltd.), astronomical and physical instruments, Pittsburgh, Pa.)

I wholly approve the substitution of the centigrade scale for the Fahrenheit. It is more logical to divide the scale into 100 degrees than into 180 plus 32 degrees, a very cumbersome method. (*N. L. Britton,* director New York Botanical Garden.)

To fix an early date for the use of the centigrade scale in Government publications may hasten the needed revision of textbooks in elementary, secondary, and higher education, and thereby lessen the confusion which is more or less inevitable in a change of habits. (*Edward F. Buchner,* professor of philosophy and education, Johns Hopkins University, Baltimore.)

I share with most scientific men a strong prejudice in favor of the centigrade. I am doubtful, however, whether it would be wise to exclude the Fahrenheit altogether, for example from the weather reports. I should think it might be better for some years to give the temperature in both scales as a transition measure to familiarize the people with the centigrade scale. (*H. A. Bumstead,* professor of physics, director Sloane Laboratory of Physics, Yale University, New Haven, Conn.)

The centigrade scale is now used in all scientific work and is in more general use throughout the world than the Fahrenheit scale. It seems an opportune moment to make the change, when we are trying to get into closer commercial touch with all the Latin-American countries. (*Alfred E. Burton,* dean Massachusetts Institute of Technology, Boston, Mass.)

Every laboratory guide for students, every reference text, and practically every book dealing with any of the chemical, physical, or biological sciences must be cluttered up with tables for conversion from one thermometer scale to another. To clear up our Government publications will go a long way toward establishing the system in all publications issued in this country; it will enable a German or French scientist to read our work without annoyance. (*Joseph S. Caldwell,* professor of botany, Alabama Polytechnic Institute and Agricultural Experiment Station, Auburn, Ala.)

The centigrade is easier to learn, easier to use. If the school children were taught the centigrade scale they would find it easier than the Fahrenheit. (*Otis W. Caldwell,* professor of botany, University of Chicago.)

I am in favor of the centigrade scale chiefly because it is more extensively used and therefore more international and more convenient. (*Philip P. Calvert,* professor of zoology, University of Pennsylvania, Philadelphia, Pa.)

I am pleased to have an opportunity to advocate the use of the centigrade scale. The Fahrenheit scale is an unnatural one. It merely "happened" that Fahrenheit called the boiling point 212°. He might just as well have called it 170° or 269°. He called "zero" the lowest temperature he could obtain from the mixture of ice and salt. This may mean something to the maker of ice cream, but the operation of mixing ice and salt means essentially nothing to anybody else in the present day. Having fixed his "boiling point" at 212° and his ice-and-salt temperature at "zero," the freezing point fell at 32°. The freezing temperature is something which the people in general fully comprehend and men of science have to deal with very frequently in their laboratories. It is a perfectly definite thing in all occupations and in all countries. It is a natural starting point and it ought to be called "zero," as it is in the centigrade scale.

The interval of 180° between freezing and boiling in the Fahrenheit scale makes the unit of 1° too small. The general public does not appreciate the difference between temperatures 56° and 54° nor between temperatures 47° and 45° nor between temperatures 170° and 165°. The larger units of the centigrade scale are abundantly small for scientific purposes and for the events of daily life.

In great sections of our country, and in the greater number and more populous of our colonies, the people have no conception of what the temperature −4° Fahrenheit means. They do not know what "zero" temperature stands for. If they are interested and able to translate it into words, they invariably compute how many degrees it is below freezing. If the centigrade scale were in use they would know immediately that it is 20° below freezing, and that would mean something to them.

Science knows no land and sea boundaries, and consequently men of science prefer to use the centigrade scale, which is universally used in the great majority of countries. The centigrade system is a scientific system. The Fahrenheit system is arbitrary and unscientific and the country which uses it is to that extent behind the times. (*W. W. Campbell*, director Lick Observatory of the University of California, Mount Hamilton, Cal.)

If this bill becomes law it will merely permit the scientists in the Government service to follow the practice in universal use by all other scientists in English-speaking countries and by the rest of the world. There is no argument in favor of the Fahrenheit scale except the tradition of long-established use. The simplicity and logic of the centigrade system are so cogent that this system is used wherever antiquated statutes do not debar it. (*A. J. Carlson*, professor of physiology, University of Chicago.)

I consider it as one of the symptoms of our American backwardness and submission to tradition that we have not long ago introduced the centigrade thermometer. (*Paul Carus*, editor Open Court, Chicago.)

I favor the adoption of the centigrade scale. (*T. C. Chamberlin*, head of department of geology, University of Chicago; director, Walker Museum.)

In scientific work the centigrade scale is used almost exclusively, both in England and in this country. In chemistry and physics one rarely sees any other scale employed. It would undoubtedly be a very good thing if the centigrade could be substituted for the Fahrenheit. (*F. W. Clarke*, chief chemist, U. S. Geological Survey, Washington, D. C.)

I am heartily in favor of the bill. (*P. P. Claxton*, commissioner of education, Washington, D. C.)

Such a bill would be not only wise but timely. All scientific men use only the centigrade scale in everything. I myself do not know the temperature nowadays in Fahrenheit terms. The Fahrenheit scale has been abandoned by the entire world, practically, with the exception of the United States and England. It has no scientific merit whatever and would be cumbersome were it not that it is absolutely ignored in scientific work. (*Charles E. Coates*, dean, Audubon Sugar School, Louisiana State University, Baton Rouge, La.)

I should be very glad to see the centigrade used in all scientific publications, including those of the Government. (*A. D. Cole*, head, department of physics, State University, Columbus, Ohio.)

It is commendable that the Government is taking such a progressive step. (*William Coleman*, professor of physics, Howard University, Washington, D. C.)

I thoroughly approve the bill. Uniformity of practice and of standards are desirable from every point of view, and we should at the earliest possible moment bring our practice into conformity with that of the majority of civilized people. (*George C. Comstock*, director, Washburn Observatory, University of Wisconsin, Madison, Wis.)

Probably no scientific man would hesitate to register his approval. Since all our scientific publications have made the change long ago, this action would simply make the Government scientific publications consistent with general scientific practice. (*John M. Coulter*, professor of botany, University of Chicago.)

I am heartily in favor of the bill. (*S. A. Courtis*, supervisor of educational research, Detroit public schools; consulting director, department of measurement, efficiency, and standardization, school of education, University of Oklahoma; secretary of section L (education), American Association for the Advancement of Science.)

I am in entire sympathy with your proposed legislation. (*F. V. Coville*, botanist in charge, Bureau of Plant Industry, Department of Agriculture, Washington, D. C.)

In common with practically all scientific workers I have long adopted and consistently used the centigrade scale. Its advantages are so obvious that they hardly need mentioning, but it may be worth while to emphasize specially the fact that the cardinal points of the scale, namely, zero and 100°, are far more convenient for use, as is its decimal arrangement, than is the Fahrenheit scale. The fact that the centigrade is used by scientists in all countries and has been adopted by almost all the leading Governments of the world is a tremendous argument in its favor. (*Henry C. Cowles*, associate professor of botany, University of Chicago.)

On general principles, or because I favor whatever makes for simplicity and uniformity and economy of time and labor, I approve the proposed change. I recognize, however, the almost insuperable difficulties to be overcome. (*W. O. Crosby*, professor of geology, Massachusetts Institute of Technology, Boston.)

The centigrade system is more convenient and in every way better than the other. If people only knew the system, they would want it. A campaign of education is all that is needed to make the change, and [illegible] (*[illegible]*, professor of [illegible], [illegible] University, New Jersey.)

[illegible]

[illegible] give a statement of reasons for [illegible] the [illegible]

[illegible]

the civilized world. The fact that so many nations have united on the centigrade scale is an a priori reason for thinking there must be some advantage for it over other scales.

The zero point of the centigrade scale is something important, namely, the freezing of water, which every farmer and householder recognizes as a very critical temperature, while 100° is the point of boiling of water, which for every housewife is a very critical temperature. By the Fahrenheit scale there are about a hundred degrees experienced in our latitude, whereas by the centigrade there are only some 55. Every unit of the centigrade scale, therefore, becomes important and easily remembered, while the units in the Fahrenheit scale are too numerous to hold readily in the mind. Thus by the centigrade 0° is freezing, 5° is cold, 10° is low temperature, 15° is high temperature, 20° is the normal temperature for rooms, at between 20° and 25° we begin to divest ourselves of the standard clothing, piece by piece, 30° is already very warm, 35° is hot, and 37° is the temperature of the blood, while 40° is rarely reached in this latitude and constitutes a point of great danger to life.

The objection is sometimes made that there are too many occasions to use minus temperatures with the centigrade scale; but in view of the fact that in parts of our country temperatures of —30° and —35° Fahrenheit are common, it is clear that the Fahrenheit scale does not relieve us of these minus signs. In the centigrade scale, however, minus means something definite, to wit, the degree of freezing that the water in the lakes and in the ground is undergoing. As in the degrees above zero, so in the minus degrees, one of the centigrade degrees indicates a readily appreciable grade of increasing danger of freezing and of discomfort.

If it be urged that the finer division of the Fahrenheit scale is necessary for some purposes, this will be readily answered by saying that in both scales the unit is wholly inadequate for scientific purposes, for which purposes these units are divided into tenths and hundredths and even thousandths for greater precision, and that in scientific work, where great precision is required, the Fahrenheit scale has gone out of use altogether.

To learn a new system of thermometric division will be no greater inconvenience than changing from local to standard time. After the lapse of a few years no one for a moment would consider returning to the antiquated system.

Naturally the makers of Fahrenheit instruments do not wish to junk their old stock, but here again the inconvenience will be only temporary and more than overbalanced by the opportunity that thermometer makers will have to concentrate their attention on a single scale. (*Charles B. Davenport,* director, Station for Experimental Evolution, of the Carnegie Institution, of Washington (Cold Spring Harbor, Long Island, N. Y.).)

Scientists the world over, so far as I know, are using the centigrade thermometer. Before any change is made, the recommendation of the men in the scientific bureaus would be exceedingly valuable. (*Eugene Davenport,* dean and director, College of Agriculture and Agricultural Experiment Station, University of Illinois, Urbana, Ill.)

The object of the bill has my unqualified approval and I am of opinion that the best interests of the Government and the people will be subserved by adopting the centigrade scale. (*Arthur P. Davis,* Director and Chief Engineer, U. S. Reclamation Service, Washington, D. C.)

There is everything to be said in favor of this change for its simplicity and common sense, and I can not conceive any serious difficulties in the way of its adoption. (*Bradley M. Davis*, professor of botany, University of Pennsylvania, Philadelphia.)

I have not the slightest hesitation in indorsing a project for the substitution of the centigrade thermometer scale in place of the Fahrenheit scale. This has been regularly done in all the scientific publications of this laboratory since its foundation in 1904, and all our records are in terms of centigrade degrees. The literature of the subjects in geophysics with which we work records temperatures, almost without exception, in terms of the centigrade scale. Even the thermometers about the laboratory for recording room temperature have long since been changed to centigrade degrees in order to spare us even this minor inconvenience of changing to an awkward scale for this everyday purpose. (*Arthur L. Day*, Director Geophysical Laboratory, Carnegie Institution of Washington.)

The centigrade scale is much simpler and so much easier to use in calculations that it would save a large amount of valuable time to many of the public servants. (*J. S. Diller*, geologist, U. S. Geological Survey, Washington, D. C.)

I should certainly favor this bill. (*Richard E. Dodge*, professor of geography, Teachers' College, Columbia University, New York.)

It would assist the advancement of scientific work in the United States. All workers in pure science, and many engaged in the solution of technical problems, use the centigrade scale and would welcome its official recognition. (*Henry H. Donaldson*, professor of neurology, Wistar Institute of Anatomy and Biology, Philadelphia.)

Speaking for several of my coworkers as well as for myself, I can say that the centigrade scale is certainly the one to be used. Its advantages and logic are so well known as to call for no comment. The fact that scientists the world over have found the centigrade scale the most convenient, speaks for itself. (*A. Eichhorn*, Chief Division of Pathology, Bureau of Animal Industry, Department of Agriculture, Washington, D. C.)

Theoretically the Fahrenheit thermometer scale should be banished from civilization. As to the best practical way of doing this there is ground for discussion. I see no reason personally why the first step should not be taken by the Government, but I do not pose as an authority on these matters, and I believe that such questions should be settled by authorities rather than by popular vote. The majority of the public give to such matters only inadequate consideration. (*David Fairchild*, Agricultural Explorer in charge Foreign Seed and Plant Introduction, Bureau of Plant Industry, Department of Agriculture, Washington, D. C.)

Count me in favor of the bill to secure use of the centigrade scale and any other radical changes. (*H. L. Fairchild*, professor of geology, University of Rochester.)

I can unhesitatingly and without reservation indorse the move. The centigrade scale is rational and satisfactory; the Fahrenheit scale is irrational nonsense and a nuisance.

I would suggest that a move be started at once to induce the Canadian Government to "follow suit," so that this whole continent may be on one scale. The Commission of Conservation might perhaps be induced to take an interest in conserving the energy wasted in computations from one scale to the other. (*B. E. Fernow*, dean, faculty of forestry, University of Toronto, Canada.)

The Fahrenheit has no natural zero; the centigrade has, and divides the interval between 0 and boiling point by a round 100. There is a great advantage in using the same scale as is used abroad, and the centigrade is now almost universal. In fact, it is already largely in use in the United States. (*Irving Fisher*, professor of political economy, Yale University, New Haven, Conn.)

I referred the matter to Mr. W. R. Metz, superintendent of buildings, who reports as follows: "The centigrade scale of temperature is used to-day in all scientific work, and the use of the two different thermometers very often causes confusion. If the period of transition is made long enough, no hardship will result." (*Cornelius Ford*, Public Printer, Washington, D. C.)

A law making the use of the centigrade mandatory is highly desirable. Having used the centigrade thermometer for my scientific work for the last 40 years and for my room temperatures for the last 10 years, I can see no possible objection to its use and the great advantage of a natural, logical system. I trust that you may succeed in introducing simplicity where now reigns complexity without a single point in its favor. (*S. H. Gage*, professor of histology and embryology (emeritus), Cornell University, Ithaca, N. Y.)

I am pleased with the revised draft of the thermometer bill. I would suggest a further amendment, however, by substituting the words "heads of departments and other independent branches of the Government" for the words "chiefs of bureaus." There should be some sort of uniformity in each department. In the Department of Agriculture, for example, where there are 12 or 14 bureau chiefs, it would be very important that its publications should have some uniformity. The way to accomplish this would be to place the power in the heads of the departments rather than in the bureau chiefs. (*Beverly T. Galloway*, dean, New York State College of Agriculture, Cornell University; former Chief, Bureau of Plant Industry, and Assistant Secretary, Department of Agriculture, Washington, D. C.)

I should heartily approve such a move as leading to a simpler standard which is used in most sciences and in many countries. (*Frederick P. Gay*, professor of pathology, University of California, Berkeley, Cal.)

I have always favored the introduction of the centigrade for all uses, but realize that it will be somewhat difficult matter to accomplish this for popular use. However, if it is to be done, a start must be made, and I know of no better way to do it than to have the Government take the initiative. (*George Gibbs*, chief engineer, Electric Traction & Station Construction, Pennsylvania Tunnel & Railway Co., Pennsylvania Station, New York.)

The proposal to substitute the centigrade scale for the Fahrenheit is a proposal to incur temporary inconvenience for the sake of permanent convenience. The change must surely come, and the practical question for the community is whether this generation shall incur the inconvenience or leave that sacrifice for a future generation.

The change of thermometer scales is a comparatively trivial matter. Very many of the instruments in use are already furnished with both scales. The important cost to the community is in mental effort—the learning to think in the terms of a new scale.

I believe the best mode of initiating the reform is the one proposed in your letter—to make Government publications an object lesson for the people; and the only practicable way to accomplish that is by act of Congress.

The cost to the Government would not be inconsiderable. Instruments and forms of the Weather Bureau would require change. The new notation for a time would have to be interpreted in terms of the old, and in other ways the popular texts would have to be expanded. There would be the same difficulty in combining old and new American temperature records that is now found in combining American records with foreign; and some of our bureaus, the Weather Bureau especially, would be subjected to the censure or ridicule which conservatism is prone to bestow on rational reforms. The cost, however, would all be incurred in a few years, and, in my judgment, the effort and money would be well expended. (*G. K. Gilbert,* geologist, U. S. Geological Survey, Washington, D. C.)

I have a copy of the revised draft of a bill to abolish the Fahrenheit thermometer and will bring it to the attention of the American Society of Zoologists at its annual meeting in Columbus, December 28–31, and will recommend the adoption of a resolution favoring the enactment of the bill. (*Caswell Grave,* professor of zoology, Johns Hopkins University, Baltimore, secretary American Society of Zoologists.)

The plan has the peculiar merit that it is not of a nature to arouse any organized opposition; even those who are constitutionally opposed to innovation will not care enough about the movement to take active steps against it. (*R. R. Gurley, M. D.,* 542 East Seventy-ninth Street, New York.)

I heartily approve of the proposition. (*Thomas H. Haines, M. D.,* clinical director, Bureau of Juvenile Research, Columbus, Ohio.)

This bill has my hearty approval. (*Percival Hall,* president Columbia Institution for the Deaf, Washington, D. C.)

I am in hearty accord with your bill. (*Paul H. Hanus,* professor of education, Harvard University, Cambridge, Mass.)

I think it ought to be done. In the case of the weather reports the plan would suffer by irritating the reader, unless the Fahrenheit temperature were given along with the centigrade. Eventually that duplication could be discontinued. (*D. W. Hering,* professor of physics, New York University.)

I beg to express my full sympathy with the proposed measure, for it would free us from the unfortunate double standard due to the use of the Fahrenheit scale in certain Government publications, whereas in all the scientific work, not only of the Government but of all the body of scientific workers throughout the country, the centigrade scale is used.

The illogical basis of the Fahrenheit scale, with its arbitrary number of degrees between the freezing point and the boiling point of water, makes it a matter of wonder why this standard has so long persisted in comparison with the very logical and simple centigrade system.

I talked recently with the representative of a large firm which manufactures thermometers. He told me that such a change would be welcomed by them and would cause but slight disturbance in their manufacturing operations, and that indeed these operations would be so greatly simplified in the future that they would gladly put up with the slight trouble of changing the stocks now in hand. (*Charles H. Herty,* professor of chemistry, University of North Carolina, Chapel Hill, N. C.; president American Chemical Society.)

Men of science everywhere use the centigrade scale, as does the Bureau of Standards, with which I am connected. Probably the most effective agency of the Government in familiarizing the general public with the centigrade scale would be the daily bulletins of the Weather

Bureau. From the moment of adoption of the resolution by Congress those bulletins might show temperatures in both centigrade and Fahrenheit degrees, coupled with the announcement that after a given date only the centigrade would be used.

Every move that tends toward simplification of our processes of measurement and computation is to be welcomed as a step forward. The temporary inconvenience that attends a transition period should count as nothing against the incalculable gain in time and saving of mental energy to future generations. (*W. F. Hillebrand*, chief chemist, Bureau of Standards, Washington, D. C.)

It seems to me that the trifling inconvenience to which people would be subjected for a few weeks or months until they had become familiar with the centigrade scale should not count against the immeasurably greater permanent convenience of using the same scale as every other country except England, and the scale used universally in all scientific work. The financial expense of making the change also is insignificant compared with the convenience gained. In brief, I can see no reason why we should not do this eminently sensible thing. (*Theodore Hough*, professor of physiology, University of Virginia, Charlottesville, Va.)

I am glad to know about the movement to replace the Fahrenheit with the centigrade. It is one which should have been started long ago. The economic entomologists of all the countries of the world are a cooperative and more or less mutually dependent body of men. Temperature records occur frequently in all our publications, and there is constant difficulty in the translation from one scale to another when studying the papers published by the workers in other countries. (*L. O. Howard*, Chief, Bureau of Entomology, Department of Agriculture, Washington, D. C.)

To illustrate the inconvenience of the simultaneous use of two thermometric scales, let me say that the matter is much the same as if we used two systems of coinage—pounds sterling, shillings, and pence, and dollars, dimes, and cents—in our mints and in our commercial transactions. Some prices would be in pounds sterling, others in dollars. The double system would be costly, confusing, and profit nothing. The two scales of temperature are equally confusing. (*H. D. Hubbard*, chief clerk, Bureau of Standards, Washington, D. C.)

The strongest argument for the centigrade scale is its simplicity. (*George F. Kay*, head of department of geology, University of Iowa, Iowa City, Iowa director of Iowa Geological Survey.)

The Fahrenheit scale is unscientific to the verge of foolishness; it is clumsy and difficult to explain; it has practically been given up in scientific and in international work; it stands in the way of progress, civilization, and mutual international understanding. In electrical engineering the centigrade scale is the acknowledged standard, to which reference is made in contracts and specifications, as indicated by the standardization rules of the American Institute of Electrical Engineers. The selection of 212° for the boiling point of water is so inconsequential as to be quaintly amusing. Any bill which will help to relieve us of the humiliation of being the laughing-stock of Europe will be a boon to America. (*A. E. Kennelly*, professor of electrical engineering, Harvard University, Cambridge, Mass.)

You are right. The sooner we become interested in international measures, the better. (*George F. Kunz*, president New York Academy of Sciences, 401 Fifth Ave., New York.)

The practical advantages of the centigrade scale over the Fahrenheit are so obvious to anyone who has had any experience in making, using, and comparing temperature measurements, and the several arguments in favor of the change are so well known to all who are competent judges of the matter that it is needless to recapitulate them. Scientific men everywhere use the centigrade scale, and only among the English-speaking peoples is the Fahrenheit scale used in daily life; and, indeed, its hold there is due to the general conservatism of the people and to the circumstance that they have not appreciated the fact that there is a more convenient way of recording temperatures. (*John Johnston,* physicist, geophysical laboratory, Carnegie Institution of Washington.)

The Fahrenheit principle is absolutely unscientific and thoroughly antiquated. The passage of your bill would signal a great progress, scientific as well as economic, and would be the means of saving a great amount of time, energy, and expenditure. (*Berthold Laufer,* curator of anthropology, Field Museum of Natural History, Chicago.)

I take great pleasure in indorsing your bill most heartily. The chief object aimed at is to introduce simplicity in the place of the present complicated system. The desirability of the change is so evident that I can hardly see how the communication that you have sent me can be much enlarged upon. (*A. O. Leuschner,* dean of graduate school, University of California, Berkeley, Cal.)

I think that scientists will be unanimous—certainly the physicists will—in supporting your bill. It is an effort for us to think in terms of the Fahrenheit scale, and its use involves great loss of economy in time and effort. (*E. P. Lewis,* professor of physics, University of California, Berkeley, Cal.)

I am heartily in favor of the change. (*Waldemar Lindgren,* professor of economic geology, Massachusetts Institute of Technology, Boston, Mass.)

I hope that the bill will be enacted. (*George Grant MacCurdy,* curator anthropological section, Peabody Museum of Natural History, Yale University, New Haven, Conn.)

I have the honor to transmit herewith the letters which have been received from the technical men of the Bureau of Mines regarding the proposed bill for the abolition of the Fahrenheit scale. You will note that it is practically the unanimous opinion that the centigrade scale should be used wherever possible, although under certain conditions it is felt by some that the Fahrenheit scale should follow in parentheses, at least until the public has become thoroughly familiar with the more modern scale of temperature. (*Van H. Manning,* Director Bureau of Mines, Washington, D. C.)

This whole question is one in which I am very much interested, but the change in scales has many far-reaching effects that are by no means appreciated by the majority of those whose approval is noted in the list you submit. It is obvious, however, that Dr. Stratton, of the Bureau of Standards, fully appreciates the complexities of the situation. I think existing legislation gives authority to introduce the centigrade scale, and additional legislation to that effect would seem to be unnecessary and have no more influence in abolishing the Fahrenheit scale than that already on the statute books. New legislation at this time should make the change more or less compulsory after a certain date, otherwise, I feel that it will serve no useful purpose. (*C. F. Marvin,* Chief of Weather Bureau, Department of Agriculture, Washington, D. C.)

The centigrade scale is in such nearly universal use by scientific men and there is such a preponderating weight of reason to support this usage that hardly any man of science as such could object to your bill.

It is indeed unfortunate that the irrational and clumsy English system of pounds, feet, and Fahrenheit scale came into use in engineering before the metric system was devised. This, indeed, is the only excuse it has for remaining to burden us. (*Alfred G. Mayer*, director Department of Marine Biology, Marine Laboratory of the Carnegie Institution of Washington.)

I think that the move is undoubtedly in the right direction. Since the centigrade scale is universally used in scientific work it is necessary for anybody having to use temperature data given in the Fahrenheit scale to make a transformation, and if this could be avoided in the Government publications it would be very desirable. (*Ernest G. Merritt*, professor of physics, Cornell University, Ithaca, N. Y.)

That the centigrade scale presents obvious advantages over the Fahrenheit is well recognized. Perhaps no standard of measurement as widely used as that of temperature could be changed with less resulting confusion and annoyance; since temperature units, unlike those of length, area, volume, and weight can not be employed to fix the dimensions of enduring structures or to delimit land areas and become embodied in the permanent records of title thereto. (*G. L. Morton*, examiner, division 36, U. S. Patent Office, Washington, D. C.)

The bill will meet with the hearty approval of men who are working in scientific investigation in this country. As it is, scientific men use the centigrade thermometer practically universally. The Fahrenheit scale should be abolished, since it is unnecessary, cumbersome, and out of date. (*Herbert V. Neal*, professor of zoology, Tufts College, Mass.)

I favor the general adoption of the centigrade scale. (*R. M. Ogden*, director psychological laboratory, University of Kansas, Lawrence, Kans.)

The bill has my cordial approval. (*W. J. V. Osterhout*, professor of botany, Harvard University, Cambridge, Mass.)

The double standard is very confusing, and as practically all scientific workers use only the centigrade the Fahrenheit is quite unnecessary. (*Richard M. Pearce*, in charge the John Herr Musser Department of Research Medicine, University of Pennsylvania, Philadelphia, Pa.)

From a scientific standpoint, the change is undoubtedly desirable. (*Edward C. Pickering*, professor of astronomy and director of Harvard College Observatory, Harvard University, Cambridge, Mass.)

I am heartily in favor of the bill. In the mere matter of the description of the weather the scale is not of great importance, but in scientific calculations of thermodynamic quantities the centigrade degree has the advantage of being international in most branches of exact science. The only exception seems to be in steam engineering, where the Fahrenheit degree has vogue along with the centigrade in the United States and in Great Britain. Much real confusion and difficulty exists on that account. For example, in the case of a man trained as a chemist anywhere in the world, the centigrade degree has entered into all of his calculations of thermal quantities. When such a man enters a profession related to steam engineering and to some branches of chemical engineering operating in connection with heat engines in the United States, he has the greatest difficulty with the use of the Fahrenheit degree. These difficulties may be overcome by the use of numerous conversion factors, but such difficulties would be avoided once for all by the use of the centigrade scale, which would be distinctly encouraged by weather reports of the Government in centigrade degrees. (*G. W. Pierce*, director, Cruft Laboratory, and assistant professor of physics, Harvard University, Cambridge, Mass.)

I most heartily approve of your bill. It will be an immense saving in time to all scientists and, when understood, a great convenience to every one.

I secured the adoption of a resolution favoring the bill by the Research Club of the university, a body of some 80 men who are selected for their interest and accomplishments in investigation of all kinds. (*W. B. Pillsbury*, professor of psychology, University of Michigan, Ann Arbor, Mich.)

Personally I favor the centigrade scale, but I think that certain bureaus of the Government, for example, the Weather Bureau, should be allowed, but not compelled, to use this system exclusively. (*M. J. Rosenau*, professor of preventive medicine and hygiene, Harvard University, Cambridge, Mass.)

I would express my unqualified approval. I have never met with the remotest shadow of an argument in support of the Fahrenheit scale. Everybody knows that the only reason for using this unscientific and inconvenient scale is habit. It is high time to follow the example of other nations in adopting a scale which shall harmonize our temperature data with those of most of the world. (*E. A. Ross*, professor of political economy, University of Wisconsin, Madison, Wis.)

I am heartily in favor of the proposed bill, and I believe this opinion will be shared by practically every man of science in this country. The centigrade scale is now used to the exclusion of others in all scientific publications except those of certain departments of our Government. The advantages of the change would apply to others than those engaged in science. American travelers are bewildered on being confronted with the centigrade scale abroad. The passage of this bill would eventually remove this embarrassment. (*Frank Schlesinger*, director, Allegheny Observatory, Allegheny, Pa.)

I can only indorse this proposal as being to my mind a very desirable change. The Fahrenheit scale is inconvenient and clumsy. (*W. A. Setchell*, professor of botany, University of California, Berkeley, Cal.)

The present use of two methods of registering temperatures by the Government is absurd. The Department of Agriculture in all its scientific reports uses the centigrade. (*S. P. Sharples*, chemist, 26 Broad Street, Boston.)

I heartily approve of this measure and believe there would be no difficulty in obtaining the formal approval and indorsement of practically all the scientific men in this country.

I inclose herewith a copy of a resolution which was adopted at the last regular meeting of the Botanical Society of Washington, November 2. We introduced this resolution as we thought an expression from a large and important botanical organization would carry more weight than a mere personal indorsement.

To scientific men no arguments in regard to the desirability of this measure are needed. The need of uniformity in recording temperature measurements throughout the world would seem to be sufficient cause for the adoption of the centigrade scale, which is already in use by practically all scientists. (*C. L. Shear*, secretary-treasurer American Phytopathological Society; Phytopathologist, Bureau of Plant Industry, Department of Agriculture, Washington, D. C.)

It is in line with scientific progress. Everything in this world should be subject to advance and improvement whenever possible. The world would stand still if precedent or long usage were considered a valid argument for never making any changes. (*Henry Skinner*, in charge of Entomology Department, American Academy of Natural Sciences, Philadelphia.)

It is greatly to be hoped that the bill will become a law. (*George Otis Smith,* Director United States Geological Survey, Washington, D. C.)

The change will have to be made some time, for it is simply inconceivable that the irrational Fahrenheit scale will be forever tolerated by an educated people. A famous proverb says, "Never put off till to-morrow what you can do to-day." Suppose the change was postponed till 1935; that would mean that the thousands of people who study temperatures recorded in different countries would be subjected for 20 years longer to the nuisance of having to think in two scales and having to convert one into the other. It would mean that thousands of new Fahrenheit thermometers would be made each year, to be discarded in 1935 and till then to afflict thousands of logical minds. It would mean that the intelligent and skilled workmen who make these thermometers would have to blush each time they etch the foolish scale on the wise instrument. It would also mean that the rising generation during the next 20 years must be taught an antiquated, irrational, difficult system, and many thousands of students must be taught two systems, when by a little manly resolution we can relieve them of that burden and leave to them the positive enjoyment of learning the easy, up-to-date, logical centigrade scale. Finally, when the change does come, the inconvenience attending it will be just the same as now, probably greater, because there will be more Fahrenheit thermometers to discard or remodel, more people to unlearn the antiquated scale, more irrational Fahrenheit records to be translated into the rational scale.

Let us not shift our burden needlessly, sluggishly, cravenly onto the shoulders of our successors; they will have plenty of burdens of their own. Let us profit by the opportunity to earn high credit for energy and progressive spirit ourselves and to stimulate our successors by our example to earn similar credit in the many lines that will still be open to them. Of course, the born kickers, like the poor, are always with us, and they are doubtless getting ready now to say no; but when the change is made, as it is sure to be made, in the near future, they will congratulate themselves if, through an undeserved mercy, their false step remains unknown to the public.

It is an insult to the American people to say that they are not sufficiently enlightened to consent to the change. The facts are so simple that any boy of 14 can understand them. There was no popular opposition to the introduction of standard time some 30 years ago, although that problem is far more difficult for the untrained mind to grasp than the centigrade scale.

Some scientific men hold aloof from the most glaringly beneficial measures from a fear of the trite objection that the benefits will accrue to scientists alone. According to that curious doctrine, the producers of lumber, wool, sugar, or iron ought not to advocate measures for their own benefit but wait in humble modesty for some one not interested in lumber, wool, sugar, or iron to render them that service. Our business men do hear that objection every day, but their healthy common sense tells them to ignore it as the inevitable, unsilenceable wagging of irresponsible tongues. Scientific men have as good a right as any other class to defend their interests, even if it were true that the general public derived no benefit from the proposed measure. In point of fact, in the present case the general public, through sheer vastness of numbers, would be the principal gainers, even though the average scientist would be benefited more than the average citizen. It

[illegible] to point out to intelligent people
[illegible] have to charge for their work, and
[illegible] work harder necessarily adds t
[illegible] whatever makes his work
[illegible] It is not the scientist alone
[illegible] to incur an unnecessary exp
[illegible] it is the public also which has to
[illegible] expenditure. But the gre
[illegible] Of the 22,000,000 school
[illegible] learn to understand what a degre
[illegible] the Fahrenheit scale is too difficul
[illegible] Call freezing point zero and boi
[illegible] will at once understand it and rememb
[illegible] Bureau of Crop Estimates, Dep
[illegible] Washington, D. C.; member of the Point Bar
[illegible] of 1881–1882.)

[illegible] in favor of the end you are endea
[illegible] the Fahrenheit scale by the
[illegible] that I am almost led to favor
[illegible] reflection I feel that very
[illegible] to be given to the form in which the
[illegible] may not cause serious trouble in the
[illegible] to some industries that are
[illegible]

[illegible] and a large percentage of
[illegible] of the centigrade scale.
[illegible] would so materially contri
[illegible] the adoption by the Governm
[illegible] the public in the use of that
[illegible] reports by the United S
[illegible] Indeed this
[illegible] that I would
[illegible] to the Weather Bu
[illegible]

[illegible]

[illegible]

[illegible]

Again, take the question of clinical thermometers used by the physician. Hundreds of thousands of these are used by the physicians in this country, and many thousands are sent annually to the Bureau of Standards to be tested. If the results of our tests are to have any value, we must give the corrections in Fahrenheit degrees. Physicians will not at once abandon the Fahrenheit scale because the Government refuses to use it. Indeed, for some years the medical bureaus of the Government have been using clinical thermometers graduated on the centigrade scale.

I wish to make it clear that I do not regard the examples cited as in any sense insuperable obstacles to a bill that will accomplish what is desired. But such questions should be carefully considered in drawing up a bill, to prevent imposing a very serious handicap on the work of some of the Government bureaus.

Possibly some of the difficulties would be removed by stating that the centigrade scale shall be the standard scale after a certain date in all Government publications, but that the use of the two scales side by side, the Fahrenheit in a secondary or parenthetical sense, is permitted for a period of years, say five, before the latter is entirely outlawed. It would seem to me quite probable that such an arrangement would be most satisfactory to the Weather Bureau, as it would gradually accustom the public to the new scale. It is quite conceivable that great dissatisfaction would result if the weather reports were suddenly published in terms of the new scale.

There is one other feature that I should like to have understood, and that is just what constitutes publication. This bureau is called upon to test all kinds of instruments for the general public, including instruments for temperature measurement. A certificate of test is issued for such instruments. I would like to make the point that such a certificate of test does not constitute "publication" in the sense intended in this bill. Obviously, such an interpretation of the bill would seriously interfere with the functions of this bureau in its work of testing for the public. If the public continues to use Fahrenheit instruments for some time after the use of that scale has been abandoned by the Government, it is obvious that the bureau must report its tests in terms of the scale on which the instrument is constructed. For example, suppose the medical profession continues to use Fahrenheit clinical thermometers. Then the bureau would have to do one of two things—either report the results of the tests on the Fahrenheit scale or take the stand that on and after the specified date it will refuse to test clinical thermometers graduated on the Fahrenheit scale.

Let me assure you of my full sympathy with the objects in view and of my hope that the bill may be put into satisfactory form, so that it will cause no serious inconvenience either to the public or to the several bureaus of the Government immediately concerned.

[Second letter.]

I am most heartily in sympathy with the effort to substitute the centigrade for the Fahrenheit scale. It is always difficult to make estimates of public opinion, but I feel fully convinced that scientific men are almost unanimously in favor of such a step, and a very large majority of our engineers would welcome the change, certainly the most progressive engineers would. We might as well admit that it would cause some inconvenience—"trouble," if you choose to call it such—but what important reform can be accomplished without inconvenience? I feel rea-

ren-
r
TE DUE

Naturally the manufacturer of thermometric instruments will encounter extra labor and expense in the adjustments incident to such a change, but realizing the advantage of having eventually a uniform standard we would welcome the general adoption of the centigrade scale. (*Herbert J. Winn,* president Taylor Instrument Cos., Rochester, N. Y.)

It would certainly be a great step toward simplification. (*C. E. A. Winslow,* Anna M. R. Lauder professor of public health, School of Medicine, Yale University, New Haven, Conn.)

There is every reason why the change should be made. Practically all foreign publications use the centigrade scale, and since it presents no difficulty to popular comprehension, I see no possible objection to the change. (*Clark Wissler,* curator department of anthropology, American Museum of Natural History, New York.)

While I am duly conscious of the criminal waste of time which has been imposed upon the people of this country by the Fahrenheit scale, still I am disposed to exercise clemency, and would suggest that the Fahrenheit thermometer be not abolished, but simply retired to the privacy of museums, there to remain as evidence of foolish and wasteful conservatism. (*Robert H. Wolcott,* head of department of zoology, University of Nebraska, Lincoln, Nebr.)

I am strongly in favor of the use of the centigrade in all United States Government publications. Practically all other scientific publications have adopted this rule. (*Charles Zeleny,* professor of zoology, University of Illinois, Urbana, Ill.)

20806—14863

○

uren-
er
ATE DUE

LANE MEDICAL LIBRARY

To avoid fine, this book should be returned on or before the date last stamped below.

B271 Johnson, A. 9289
J66 Abolish the Fahren-
1916 heit thermometer

NAME DATE DUE